

CLAIMS

1. A method of decomposing a seismic wavefield ,
wherein a 3D wavefield is obtained by a cross-line
5 acquisition and filtered applying a decomposition filter
having two spatial directions to obtain a decomposed
wavefield.
2. The method of claim 1 wherein the decomposition is
10 for at least one of a group consisting of up- / down going
decomposition , P/S decomposition, elastic decomposition and
acoustic decomposition.
3. The method of claim 1 wherein the filter comprises
15 in-line (k_x) and cross-line components (k_y) or a spatial
representation of the in-line (k_x) and cross-line components
(k_y) .
4. The method of claim 1 wherein the filter is applied
20 as a cascaded filter.
5. The method of claim 1 wherein the filter is a
compact filter.
- 25 6. The method of claim 1 wherein the filter filters an
obtained pressure wavefield.
7. The method of claim 1 wherein the filter
exclusively filters an obtained pressure wavefield.
- 30 8. The method of claim 1 wherein the step of applying
the filter is preceded by a calibration step to match

geophone recordings with hydrophone recordings.

9. The method of claim 1 wherein the step of applying the filter is followed by a step of removing multiples from
5 a component of the decomposed wavefield.

10. The method of claim 1 wherein the step of applying the filter is followed by a step of imaging or migrating the filtered wavefield to generated an image of subterranean
10 formations.

11. The method of claim 1 wherein the wavefield is obtained through receivers located on the sea floor.

15 12. The method of claim 1 wherein the wavefield is obtained through receivers towed by a vessel.